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ABSTRACT

This paper presents findings of a study that examined relationships between several antecedent variables (student ability, family environment, and school climate) and student academic achievement. The research also examined the role of motivation as a moderator between ability and academic achievement, and as a mediating variable between family environment and academic achievement and between school climate and academic achievement. The study was conducted in a small town in the Southeast United States. A survey questionnaire was administered to 241 high school freshmen, of whom 76 were black, 158 were white, and 7 were classified as "other." Findings indicate that student motivation showed no significant effect on the relationship between ability and academic achievement. However, motivation acted as a moderating variable between ability and academic achievement for black students. The findings suggest that the elements of both school climate and family environment have a stronger direct impact on academic achievement. It is recommended that school-family programs be developed to facilitate student motivation and improve teacher-student relationships. (Contains 28 tables.) (LMI)

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The Effect of Motivation on the Relationship of School Climate, Family Environment, and Student Characteristics to Academic Achievement

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The Effect of Motivation on the
Relationship of School Climate, Family Environment,
and Student Charactersitics to Academic Achievement

Past school climate literature has historically been related to two traditions: the investigation of school effects and the study of organizational climate (Anderson, 1982). One of the earliest concepts of a school's climate, developed by Halpin and Croft (1962), envisioned climate as the personality of the organization. Anderson (1982), in a review of the research on school climate, utilized an organizational taxonomy to address the issue. She compared a wide range of theoretical discussions, climate instruments, and models and concluded that school climate is the total environmental quality of a school.

Viewing school climate as an antecedent rather than an outcome variable, school-effects research is concerned with the factors that affect academic achievement. This line of research examines cultural elements of climate, such as the norms shared by students (Miskel & Ogawa, 1988). For the purpose of this study, school climate was defined as the characteristics of the total environment that contribute to positive student outcomes, in this case, academic achievement.

The family is the primary social system for children (Hartup, 1979). Four decades of research indicate that the socialization of children is related to at least two variables of parental behavior: parental control and parental support (Rollins & Thomas,' 1979). Parental control is defined as parental behavior toward the child which directs the behavior of the child in a manner desirable to the parents. The other construct support is defined as behavior that confirms in the child's mind that he or she is basically accepted. Rollins and Thomas (1979) also have generalized that culturally-

valued child behaviors, including academic achievement, are associated with the supportive behavior of parents toward their children. In an earlier review cited in Rollins and Thomas, high parental support and high parental control were associated with high achievement (Becker, 1964).

Cassidy and Lynn (1991) included a specific factor of the family's socioeconomic status, crowding, as an indicator of how being disadvantaged affects educational attainment. They found that a less physically crowded environment, along with motivation and parental support, were associated with higher educational levels of children. Religiosity as an aspect of the family environment is another independent variable possibly influencing academic achievement. Religious involvement in a family includes affiliation, church attendance, and personal beliefs (Bahr, Hawks, & Wang, 1993).

While general intellectual ability correlates strongly with classroom outcomes, motivational variables, including self-efficacy, may affect students' confidence in their ability to perform the necessary tasks for the desired classroom performance (Horn, Bruning, Schrau, Curry, & Katkanant, 1993). Motivation is referred to as multidimensional: it measures impulsive and deliberate action, is concerned with the internal and external factors, and observes causes for behavior (deCharms & Muir, 1978). Self-efficacy, a part of social learning theory, is a psychological procedure that affects behavior and is a factor in motivation (Bandura, 1977). Recent studies have supported Bandura's findings about the relationship of self-efficacy to academic success (Multon, Brown, & Lent, 1991).

Cassidy and Lynn (1991) explored how family environment impacts motivation and achievement. Perhaps the most interesting finding in their study was that motivation served as a mediating variable between home background, personal characteristics, and educational attainment. In a recent

study of 11-14-year-old children (Grolnick & Slowiaczek, 1994) found that motivation was also a mediating variable between parental involvement and children's school performance. Based on their past studies, they suggested that positive aspects of both the home and school are necessary for children's academic success.

The hypotheses investigated included relationships between several antecedent variables (student ability, family environment, and school climate) and student academic achievement. In addition, the research focused on the role of motivation as a moderator between ability and academic achievement and as a mediating variable between family environment and academic achievement and between school climate and academic achievement.

METHODOLOGY

This study was conducted in a small town in the Southeast where the presence of a large state university has resulted in a largely bi-modal socio economic population. Participants were 241 high school freshmen, of which 76 were Black, 158 were White, and 7 were classified as Other. There were 128 females and 113 males.

The survey questionnaire was administered by the researcher to all subjects at the same time in the school auditorium to insure consistency of instruction (Heppner, Kivlighan, & Wampold, 1992). Because the participants provided their names on the survey questionnaire, confidentiality of individual responses was emphasized. Having the names on the survey allowed for matching survey responses with grade point average.

Research Instrument

The survey questionnaire consisted of 163 items providing individual and family demographic information and responses to perceptual measures for each of the study variables. Reliabilities for school climate variables ranged from .62 to .84 with most in the .70's. The family environment reliabilities ranged from .71 to .89. The motivation variables reliabilities ranged from .61 to .89.

School Climate

The principle evaluation of school climate was done using the Comprehensive Assessment of School Environment (CASE) instrument. This measure was developed in 1982 by the National Association of Secondary School Principal's Task Force on School Climate (Keefe & Kelly, 1990). The CASE subscales were developed from factor analysis and included the following

subscales: teacher-student relationships, security and maintenance, administration, student academic orientation, student behavioral values, guidance, student-peer relationships, parent and community-school relationships, instructional management, and student activities.

In a review of the CASE instrument, Leong (1992) indicated that the lack of scales to measure the climate for cultural diversity was one of the major problems with the instrument. Therefore, three subscales (racial discrimination, gender discrimination, and sexual harassment) were included to examine possible discriminatory climates. These items were derived from a widely used instrument developed for the military (Landis, Dansby, & Faley, 1993). Based on the literature review presented earlier, there was additional concern regarding other potential school situations. Factor-analyzed subscales were developed in a pilot study for measuring additional school climate areas: gang activity, school safety climate, and cheating.

Family Environment

Two subscales (acceptance/involvement and strictness/ supervision) developed by Lamborn, Mounts, Steinberg, and Dornbusch (1991) were used for measuring family environment. Additionally, three items were chosen from a 10-item moral-religious emphasis scale developed by Moos (1974). These items were selected on the basis of behaviors evidenced rather than attitudes or beliefs. The Cassidy and Lynn (1991) measure of crowding (the total number of family members living in a home divided by the number of bedrooms) was added to the instrument.

Individual Variables

Two scales, work ethic and competitiveness, were selected from six factors developed by Cassidy and Lynn (1989) to measure the facets of

achievement motivation. The recently revised Harter motivation instrument (Harter, Whitesell, & Kowalski, 1992) was used to measure independently whether a student's motivation was intrinsically or extrinsically oriented. Self-efficacy was measured by the Brookover Self-Concept of Ability Scale (Brookover, 1962), indicating a student's perception of relative scholastic success and the strength of future educational plans.

The Differential Aptitude Test (DAT) (Bennett, Seashore, & Wesman, 1982) was administered to these subjects in the fall of their freshmen year. The scholastic aptitude score of the DAT was used as a measure of student ability.

Because high school grades are generally viewed as indicators of academic success in school (Hagborg, 1992), in this study an overall grade point average from the semester in which the survey was administered was used as the measure of academic achievement.

Data Analysis

Moderated regression technique was used to examine the influence of motivation on ability-achievement relationships. Aldag and Stearns (1988) found that conventional forward "moderated regression has generally supplanted subgroup analysis for examination of moderating effects" (p. 269). They cite Cronbach's (1987) finding that alternative procedures (to moderated regression analysis) are unacceptable and problematic. Stone (1988) also cited the significantly increased use of moderated multiple regression (MMR) to detect moderation effects. These researchers recommendations are heeded here, and the analysis of the possible moderation between ability and achievement by the motivation variables is by traditional moderated regression analysis, using standardized regression coefficients. That is, they are analyzed by first

assessing the significance of ability by regressing it separately against achievement.

The use of mediating variables has long been recognized as an important effect of stimuli on behavior mediated by internal processes (Baron & Kenny, 1986). Although ANOVA offers a limited test for mediators, an estimation of a series of regression models provides a more rigorous approach. Three regression equations test for mediation. Baron and Kenny (1986) suggested

> first, regressing the mediator on the independent variable; second, regressing the dependent variable on the independent variable; and third, regressing the dependent variable on both the independent variable and on the mediator. There is no need for hierarchical or stepwise regression or the computation of any partial or semi-partial correlations. (p. 1177)

These three regression equations offer the mediation model's linkages. Three conditions must be met to establish mediation: first, in the first equation, the mediator must be affected by the independent variable; second, in the second equation, the dependent variable must be affected by the independent variable; and third, in the third equation, the dependent variable must be affected by the mediator. The effect of the independent variable on the dependent variable must be less in the third equation than in the second, after the predicated direction of the above conditions hold. If the independent variable has no effect when the mediator is controlled, perfect mediation occurs.

Results

One of the primary hypotheses in this research concerned a possible moderating influence of motivation on the relationship between ability and

academic achievement. For each of the five facets of motivation (self-efficacy, work ethic, competitiveness, intrinsic motivation, and extrinsic motivation), ability was first entered into the regression analysis with academic achievement as the dependent variable. In the second step, the motivation facet was entered, and, in the third step, the interaction term (ability X motivation facet) was entered.

Table 1 provides the results of the moderated regression analysis indicating the significance of the R^2 change due to the interaction effects. As evidenced by the lack of significant F's, none of the R^2 changes for these interaction terms was significant. Consequently, in this particular study, it does not appear that motivation moderated the relationship between ability and academic achievement.

Table 1 about here

Another research hypothesis concerned a possible mediating effect of motivation on both the relationship between family environment and academic achievement and between school climate and academic achievement.

First, as shown in Table 2, there were two significant correlations between the five dimensions of motivation and grade point average. The correlation of .634 between self-efficacy and grade point average was the strongest, while the correlation of extrinsic motivation and grade-point average was also significant at .208.

Table 2 about here

Because Table 2 indicated that only extrinsic motivation and self-efficacy were significantly related to academic achievement, they were the only motivation facets examined in the three mediating regression equations. Table

3 reports the first equation in this analysis where the mediator, motivation, is affected by the independent constructs, school climate and family environment.

Table 3 about here

Then, in Table 4, the second regression analysis treats academic achievement as the dependent variable and school climate and the family environment as the independent variables. Here, only 4 out of 19 relationships indicate significance.

Table 4 about here

In Table 5, the third regression equation treats academic achievement as the dependent variable, entering the motivational variables simultaneously with both the school climate and family environment variables. In this final step, only 3 out of the 29 relationships show significance. Table 5 provides a summary result of applying the Baron and Kenny (1986) method of determining the mediating effect of motivation between school climate and family environments on academic achievement.

Table 5 about here

In meeting the criteria of being significant on all three equations plus having a decreased strength from equation two to equation three, Table 6 indicates that self-efficacy does perform as a mediator in one school climate variable (student-academic) and one family environment variable (crowding).

Table 6 about here

DISCUSSION

The purpose of this study was to investigate the relationship of school climate and family environment on student academic achievement. Additionally, the study included an investigation of the relationship of individual motivation with family environment and school climate, as well as the effects of motivation on the relationships between ability and academic achievement, and between both family environment and school climate on academic achievement. A summary of the findings regarding the major hypotheses follows.

Hypothesis: Motivation will moderate the relationship between ability and academic achievement. Specifically, individuals with greater motivation will have a stronger positive relationship between ability and academic achievement than will individuals having less motivation. The moderated regression analysis showed that motivation did not add a significant amount to the ability and academic achievement relationship. It should be noted, however, that the strong relationship between ability and academic achievement (r = .62) does not leave much room for other factors to account for additional variance. Therefore, for additional analysis of motivation as a moderator, the participants were divided into two subgroups, by race, to determine any additional influences of motivation. Moderated regression analysis of the two subgroups did show that motivation acted as a moderating variable between ability and academic achievement for black students but not for white students. This finding might indicate that black students with more motivation have a stronger relationship between their ability and grade point average than do less motivated students.

Hypothesis: Motivation will serve as a mediating variable between both family environment and academic achievement and between school climate and academic achievement. While self-efficacy did serve as a mediating variable between one facet of school climate and academic achievement and one facet of family environment and academic achievement (Table 6), the lack of additional mediating relationships would suggest that the elements of both school climate and family environment have a stronger direct relationship to academic achievement, working through dynamics not measured in this study.

There are certain limitations of this study that need consideration. Because this was not a longitudinal study, determination on the direction of causality cannot be ascertained. Second, the factors of the independent variables were not an exhaustive list. Other factors relating to motivation and achievement, for example, could change the conclusions about the study. Third, the outcome measure was limited. Academic achievement as determined by the grade point average of one semester of work restricts the overall concept of school success. A follow-up study might provide a more reliable picture of academic achievement when five or six semesters of school have been completed. Finally, the results may not be generalized to the populations of various types of schools, such as private schools, large, urban schools, uniracial schools, or, possibly, even schools in other regions or countries.

The results of this study do provide data for educators to utilize as they respond to the demands of educational reform in the local, state, and federal levels. Public school administrators need to recognize, anew, perhaps, the crucial aspect of the teacher-student relationship and the academic success of students.

The finding of a mediating effect of self-efficacy on academic achievement suggests more examination is appropriate on family and school

climates which may increase or degrease this facet of motivation. The growing evidence that spotlights the necessity of strong parenting and positive school environments in the lives of our country's children can no longer be ignored. Schools must utilize current research data and proactively engage parents and teachers in the education of our children.

Often educators complain that students are unmotivated to learn; parents echo this cry and each blame the other for the students' apathetic response to learning. If schools and parents focused on the different parts of academic motivation and developed meaningful programs, across the home and classroom, possible gains could result.

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Table 1

Moderated Regression Influence of Motivation in the Ability-Academic Achievement Relationship

Source	Multiple R	R^2	Change in R^2	F	Incremental Change F	P
Ability	.6153	.3786	.3786	108.43	108.43	.000
Self-efficacy	.7230	.5228	.1442	96.95	53.49	.000
Ability x self-efficacy	.7273	.5289	.0062	65.87	2.30	.132
Ability	.6153	.3786	.3786	108.43	108.43	.000
Work ethic	.6295	.3963	.0177	58.10	5.21	.024
Ability x work ethic	.6344	.4025	.0062	39.52	1.81	.180
Ability	.6153	.3786	.3786	108.43	108.43	.000
Competitiveness	.6171	.3808	.0177	54.42	.63	.428
Ability x competitiveness	.6226	.3786	.0062	37.13	1.97	.162
Ability	.6153	.3786	.3786	108.43	108.43	.000
Intrinsic motivation	.6339	.4019	.0223	59.46	6.90	.009
Ability x intrinsic motivation	.6384	.4076	.0057	40.36	1.70	.194
Ability	.6153	.3786	.3786	108.43	108.43	.000
Extrinsic motivation	.6328	.4004	.0218	59.10	6.46	.012
Ability x extrinsic motivation	.6367	.4054	.0050	40.00	1.48	.226

Table 2

Correlations Between Motivation and Academic Achievement

Motivation Variables	Grade point average
Work ethic	.132
Competitiveness	.083
Intrinsic motivation	.126
Extrinsic motivation	.208*
Self-efficacy	.634**

* $p < .05$.
** $p < .001$.

Table 4

Equation 2 - Academic Achievement as the Dependent Variable

Independent variable	Dependent variable (academic achievement)
School climate	
Teacher student relationship	.238**
Security	.023
Administration	.013
Student-academic orientation	-.158*
Student behavior	-.087
Guidance	-.011
Student peer relationships	.148
Parent-community-school relationship	.041
Instructional management	-.017
Student activities	.061
Cheating	.131
Safety	.183*
Race discrimination	-.065
Gangs	-.057
Sexual harassment	-.049
Family environment	
Warmth/acceptance	.079
Strictness/supervision	.118
Religiosity	.044
Crowding	-.196**

* $p < .01$.
** $p < .001$.

Table 5

Regression Analysis: Mediating Effect Equation 3 - Academic Achievement as the Dependent Variable with Motivation Variables Included Simultaneously with the Independent Variable

Independent variable	Dependent variable (academic achievement)
Analysis 1	
School climate	
Teacher student relationship	.195*
Security	.031
Administration	.006
Student-academic orientation	-.069
Student behavior	-.028
Guidance	-.085
Student peer relationships	.056
Parent-community-school relationship	.082
Instructional management	-.005
Student activities	-.018
Cheating	-.044
Safety	.091
Race discrimination	-.025
Gangs	.011
Sexual harassment	-.004
Motivation	
Self-efficacy	.590**
Work ethic	-.017
Competitiveness	-.008
Intrinsic motivation	-.057
Extrinsic motivation	.081
Analysis 2	
Family environment	
Warmth/acceptance	-.012
Strictness/supervision	.056
Religiosity	.025
Crowding	-.060
Motivation	
Self-efficacy	.646**
Work ethic	-.028
Competitiveness	-.066
Intrinsic motivation	-.001
Extrinsic motivation	.092

Table 6

Results of Mediating Analysis for Self-Efficacy Facet of Motivation

Significant variable	Second equation	Third equation
School climate		
Student academic orientation	-.158*	-.069
Family environment		
Crowding	-.196**	-.060

* $p < .01$.
** $p < .001$.